

# **Summary of Key Points**

## **Peaceful Uses of Nuclear Technology**

### **Workshop II**

***Atoms for Peace  
After 50 Years***

**LLNL-CGSR**

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# REALIZATION OF THE VISION OF BENEFITS FROM PEACEFUL USES?

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- **Major deployment of new combustion-free source of power to generate electricity**
- **Nuclear medical diagnosis and therapy applied widely**
- **Radioisotopes applications ranging from industrial non-destructive inspection to space power**
- **Irradiation to improve agriculture and food**

# OVERALL REALIZATION OF THE VISION?

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- **Horizontal spread of nuclear weapons limited: 6 more nations compared to predictions of 50**
- **Nuclear weapons states' arms race halted; nuclear arms reductions post cold war**
- **Major benefits from nuclear technology**
- **Setbacks in past decade:**
  - **Major deficiencies revealed in inspection, export control, and compliance measures**
  - **More nations undertaking weapons development**
  - **Growth of peaceful applications slowed**

# **FUTURE DEPLOYMENT OF PEACEFUL USES: NUCLEAR POWER**

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- **Present generation of nuclear power plants are economically competitive; further expansion of their use will occur through extended life**
- **Adding new plants of proven technology depends on cost/financing and fossil fuel air pollution/carbon control actions**
- **Deployment of advanced plants for electricity and hydrogen production will require major RD&D with improved nonproliferation measures for fuel recycle; international cooperation important**
- **Spent fuel disposition necessary**
- **Greater public acceptance needed**

# **FUTURE DEPLOYMENT OF PEACEFUL USES: NON-POWER TECHNOLOGIES**

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- **Present widespread medical, agricultural, and industrial applications will expand**
- **Advanced non-power nuclear technologies will be developed and deployed**
- **Conversion of research reactor fuel to low enrichment needed for proliferation resistance**
- **Increased export controls needed**
- **Safe-handling and accountability standards need to be internationalized**

# IMPROVED PROLIFERATION CONTROLS

- **Strengthen intrinsic proliferation resistance of fuel enrichment and reprocessing**
- **Strengthen institutional (extrinsic) measures**
  - **Export controls**
  - **Materials protection and accountability**
  - **Inspections to verify compliance**
  - **Enforcement in event of non-compliance**
- **Integrated proliferation resistance assessments up front to balance intrinsic and extrinsic features**
- **Increased top level governmental visibility of proliferation resistance, e.g., “peer review”**

# **INTERNATIONAL NUCLEAR FUEL SERVICES TO IMPROVE ECONOMICS & PROLIFERATION CONTROL**

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- **Regional spent fuel storage and disposition facilities**
- **International separated plutonium banks**
- **Regional fuel services**
  - **Enrichment**
  - **Fuel recycle (reprocessing and fabrication)**
- **Assurance of fuel supply an important incentive for using such services in compliance with NPT**

# **IMPACT ON PROLIFERATION REGIME IF PEACEFUL USES PHASE OUT**

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- **Enrichment/separation can still be used to produce weapons materials**
- **Large quantities of weapons-usable materials must still be protected from diversion**
- **Means of disposing of excess weapons materials is reduced**
- **Human infrastructure to handle above is reduced**
- **Radiological isotope production curtailed**
- **Benefits of nuclear technology reduced/lost**



# **STRENGTHENING SECURITY AGAINST TERRORIST ATTACK**

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- **Nuclear power plants/facilities**
- **Research reactors not converted to low enriched uranium**
- **Radiological sources useable in RDDs**

# **FUTURE DIRECTIONS; EXPANDING THE VISION?**

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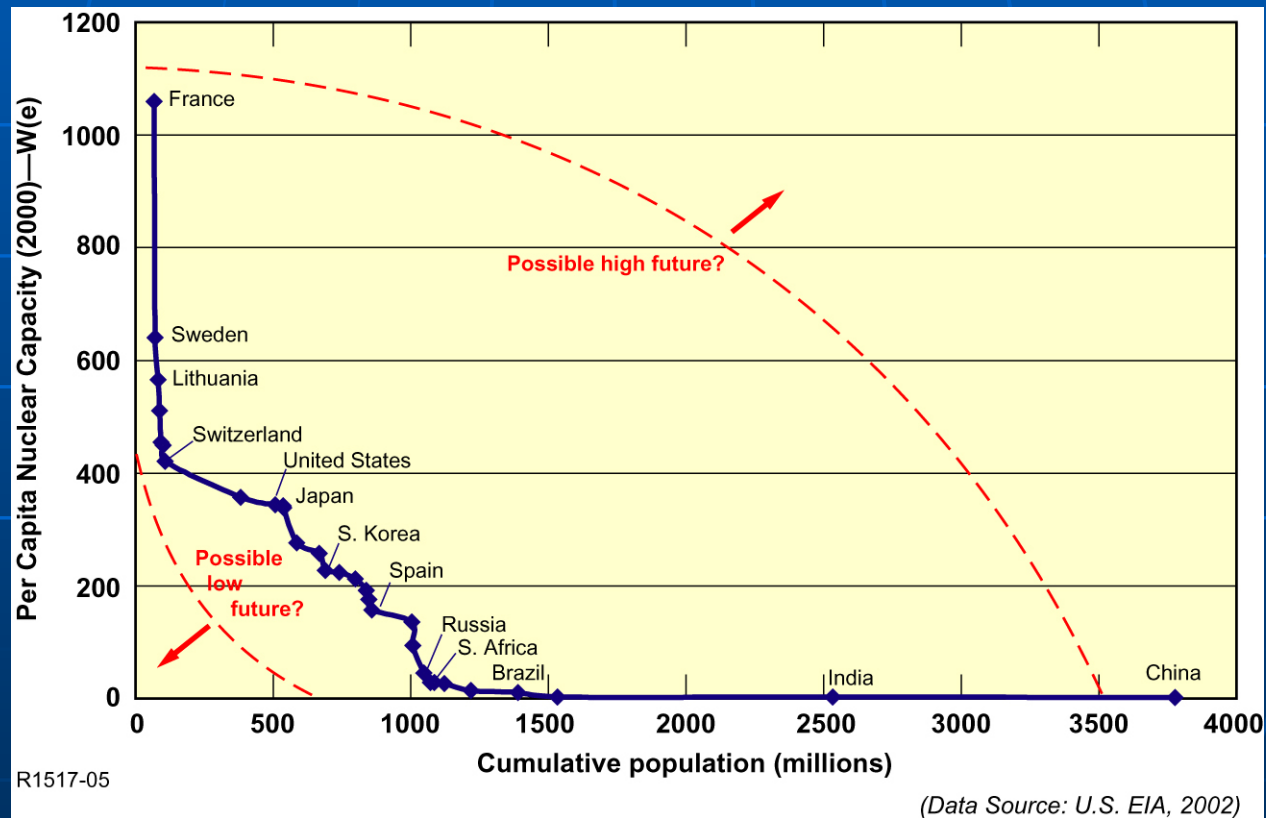
**Two present realities call for expanding the original "Atoms for Peace" vision:**

- Disparity of benefits of nuclear technology between the developed and developing world**
- Weapons proliferation concerns shifted from developed to developing nations and terrorists**

**An expanded vision beyond the measures previously delineated to strengthen the NPT regime?**

- Furnish the rapidly growing poverty-stricken populations with greater share of benefits of appropriate nuclear technologies**
- Forestall rogue State and terrorist actions that disregard the NPT and international norms e.g. intelligence, diplomacy, sanctions, military action**

# PER CAPITA NUCLEAR CAPACITY BY COUNTRY



# **RECOMMENDATIONS FOR WORKSHOP 3**

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- **Benefits of nuclear technology should be applied more widely in future “Atoms for Peace”/NPT**
- **Public acceptance a critical factor**
- **An expanded future “Atoms for Peace” nonproliferation regime is needed:**
  - **Stronger safeguards inspections and accountability and an effective enforcement element of NPT**
  - **improved proliferation risk management for the fuel cycle (enrichment, reprocessing, disposition**
  - **Regulated, transparent international fuel services**
  - **broader incentives, e.g., fossil and renewable power, and fuel supply assurances**
  - **Prevention of proliferation by those outside the NPT**